UNIVERSITY OF WASHINGTON

ARBORETUM BULLETIN

Published Quarterly by the Arboretum Foundation

FALL, 1974

THE ARBORETUM BULLETIN

Vol. XXXVII, No. 4
Seattle, Wa., Fall, 1974

OFFICERS

N. Stewart Rogers
President
Prentice Bloedel
Vice-President
Mrs. Gordon Logan
Vice-President
Mrs. Moritz Milburn
Vice-President
Captain W. R. Wilson
Vice-President
Mrs. Allen D. Moses
Secretary
Phyllis Cavender
Treasurer
Mrs. Marilynn R. Holm
Executive Secretary

BULLETIN EDITORIAL BOARD

Gordon D. Marckworth
Editor Emeritus

Mrs. Joseph P. Butler
Editor
Mrs. Hugh Baird
Mrs. Robert Berry
Mrs. Allen B. Engle
Mrs. Percy Guy
B. J. D. Meeuse
Brian O. Mulligan
John A. Putnam
R. F. Stettler

HONORARY

Joseph A. Witt

PRESIDENT'S MESSAGE

By the time you receive this *Bulletin*, the University of Washington will have announced its intention to develop a site on its East Campus for purposes of Arboretum-related research and teaching, leaving the present Arboretum as primarily a public display facility.

It is the expressed intention of the University that the new facilities will be supplemental to those of the present Arboretum, and that the University will continue, in conjunction with the City of Seattle, to maintain and improve the Arboretum at Washington Park.

Your officers plan to conduct detailed reviews with both the University and the City of Seattle to determine their respective positions regarding future cooperation with and support of the Foundation and the Unit Council.

At the conclusion of these reviews, we will report to the membership on the range of alternatives available to us, and expect to ask for membership direction with respect to our future course of action under these new conditions.

Sincerely,

The ARBORETUM BULLETIN is a journal of general horticultural information published quarterly, as a bonus of membership, by the University of Washington ARBORETUM FOUNDATION, a non-profit organization to further the development of the University of Washington Arboretum. Information regarding membership in the Foundation may be obtained by writing to the ARBORETUM FOUNDATION, University of Washington, 98195 or by calling 325-4510. Articles on botany and horticulturally related subjects written by professional and amateur botanists, horticulturists, educators and gardeners are welcomed. No part of this BULLETIN may be reprinted without the authority of the ARBORETUM FOUNDATION. Lithography by Frayn Printing Company.

THE UNIVERSITY OF WASHINGTON
Arboretum bulletin

VOLUME XXXVII, NUMBER 4
Fall, 1974

TABLE OF CONTENTS

President's Message ..... N. Stewart Rogers — Inside Front Cover
Evolution of the Garden with Food and Flowers ..... William Talley — 2
Hybridizing Rhododendrons ..... Marty McBrayer, Gwen Bell — 5
Landscape Tree Evaluation in Oregon ..... R. L. Ticknor — 9
Autumn Walk in a Japanese Garden ..... Mike Fowler — 13
Arboretum Classes 16
New Members 16
Arboretum Spotlight ..... J. A. Witt — 17
Favorites — New Writers Wanted! ..... May Guy — 18
Our Readers Write 19
Unit Conversations ..... Shirley Veblen — 24
Book Reviews 24

COVER PHOTO
Eucalyptus niphophila
Leaves 6½ inches long; capsules about ⅜ inches diameter; very glaucous.
Photo: William Eng

A perfect cosmic symbol: yellow energy force radiating white — the combination of all colored light. Shasta Daisy. Photo: Mike Whalen

Evolution of the Garden with Food and Flowers

*WILLIAM TALLEY**

We have a two hundred year heritage as gardeners yet many Americans have never experienced the essence of gardening—the expectation of making the garden active in a certain way and nurturing it into production. These Americans have not felt the suspense of watching, watering, feeding and waiting as blossoms open, fruit forms. They have not known the satisfaction of harvest—both physical and visual harvest. Other gardeners have become almost entirely involved with the horticultural and landscape architectural vocabulary of the form and foliage of woody materials.

The satisfying rewards of gardening with annuals, perennials, biennials, and bulbs have been displaced in lives crowded with media bombardment, endless pursuit of success and economic worry. The therapy for these urban woes for many is now in this high maintenance gardening—working with soil and plants, the kharma of intimate association in the evolution of life chain.

The nineteen-sixties youth revolution turned towards what I term "cosmic" gardening, as an activity geared towards a simpler pace and the return to earth resources. Most young people of that era had never had the chance as children to grow squash or marigolds. They, in addition, scorned the repetitive maintenance and tidy features of the parental suburban garden as being another token of restraint/conformity. Nearly ten years have passed and many of the young adults from the mid-sixties have retained their interest in this mixed "cosmic" gardening. They have published books about organic vegetable gardening and are now moving into flowers (the endless evolution: food—flowers—shrubs). These publications have reached and affected many people in their respective garden directions and the ultimate evolution of gardens (what do you think, Gertrude Jeykyll?).

A brief explanation of the term "cosmic" in this context is the motivation of young people to be "in tune" with the cosmos, the

*The author is a landscape architect and partner in the firm Talley/Roberts & Associates. The article is a partial summary of an illustrated book being prepared about the evolution of small gardens since 1776.

A dramatic ornamental edible — the artichoke. Photo: Mike Whalen

rhythmic cycle of seasons, and the sun as an energy force. We have learned that ecologic balance is imperative. When I describe a garden as "cosmic", I intend to describe a garden whose very presence is a condition of the gardener's awareness of his place on this planet and his many needs for the existence of a garden.

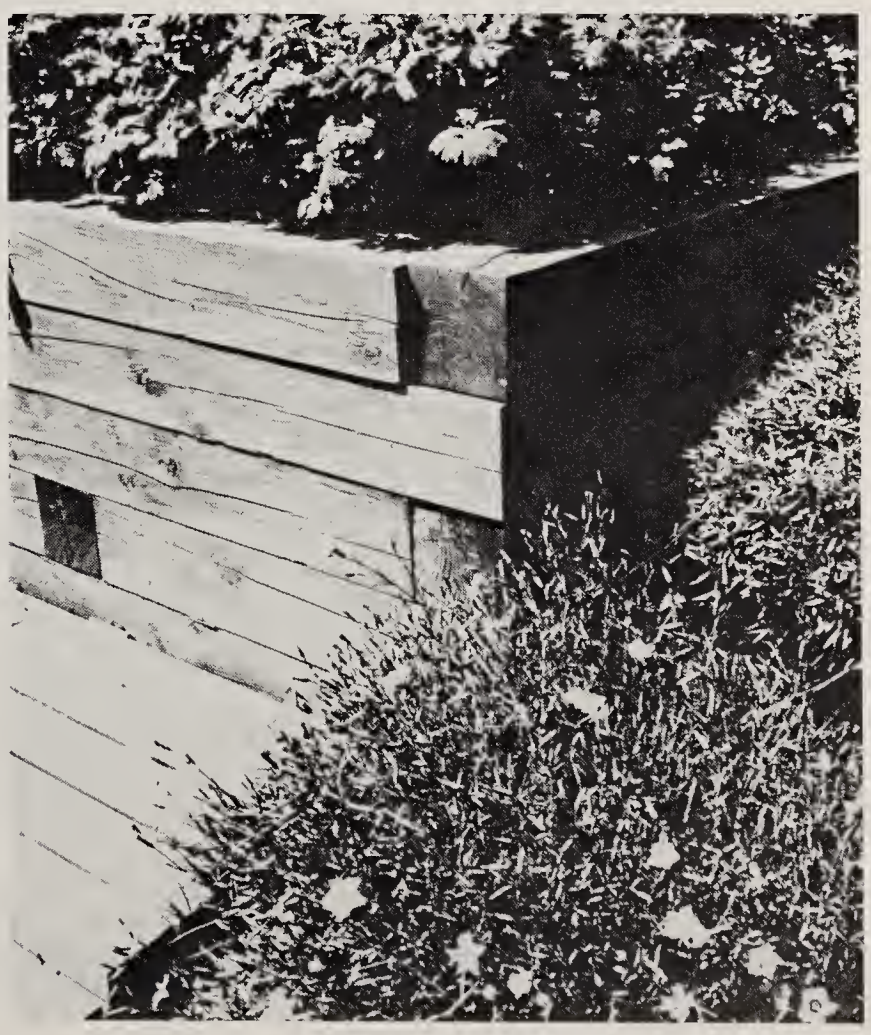
Where are we in the evolution? The "cosmic" garden would seem to have the exact appearance, if different motivation, of the English cottage garden of one hundred years ago. In both new and old, there is food production, flowers, and the remnant shrubs of an earlier garden or the introduction of new shrubs. It is so much more than a setting, or appearance. The importance of food harvest has been reinforced by inflation in food costs. So we find this trend is spreading, not always intact but in pieces to many socio-economic groups of people—a new-old form of garden interest—the form being a mixed/blended/mingled/combined garden.

Why did the mixed garden ever disappear? We had this garden form right up through the beginning of the twentieth century from the earliest colonial gardens. The simplest review of history in cultural and economic terms gives the answer. With the continued urbanization in the nineteenth century of America and intensive urbanization following the first World War, there was a growing availability of fresh and processed food to the average consumer in the town or city. (Why bother with vegetables?) Technological advances gave more diversion to life in the form of radio, motion pictures, and television. Travel was easier; Americans were less at home. (Why bother with annuals?) The clothesline disappeared with the appearance of the drying machine and the compost heap was reduced to grass clippings. Finally, after World War II, we only thought of being outside to barbeque, to clean up and care for the "yard," or to go to the car—the most frequent destination in leaving the shelter of the house.

Where will the "cosmic" or mixed garden lead—or will it fade in its fashion and consuming requirements back into near oblivion as interest in plant materials evolves and other concerns fragment gardening time? Logically, the youth revolution has strongly affected the habits and fashion of American lives and is a lasting influence as a reawakening force towards the interrelationships of earth life. This is a complex cosmic relationship which is intriguing to many as a philosophy on the way of life—a religion.

This understanding is reinforced by earth and space-satellite laboratory findings; thus, religious/philosophical ideas and science are in union—a strong combination. This places

The warm energy of the sun, on a bench, surrounded by the fragrance of flowers. Photo: Mike Whalen



ecological/environmental concerns in action as the garden form to produce meaningful experience as well as a product.

With this direction, we can predict a continued upswing in interest and effort in the American "cosmic" garden (and in related ideas) through at least 1980. That could be a lot of food and flowers. Equally important are successful approaches so that this gardening can be enjoyed and assimilated into continuously changing patterns of life, a meaningful contribution to the evolution of the person. ▲

Vegetables at sea — the houseboat harvest. Photo: Courtesy *The Seattle Times*

HYBRIDIZING RHODODENDRONS

EDITORIAL NOTE: The two articles which follow are papers which have been presented in the Rhododendron Study Group. We are pleased to print them here as representative of the work done by our Unit Council members in their study groups.

Part I

The technique used to hybridize rhododendrons is covered in many books and publications, Leach's *Rhododendrons of the World* and the January, 1972, issue of the ARS *Quarterly Bulletin*, to name two.

Some experts suggest that by cutting away the corolla of the flower, one removes the landing field of the insects that might bring in unwanted pollen. . . . *and no covering is necessary*. . . . perhaps they do not have Mr. Bumble Bee to contend with . . . . the BUMBLING BUMBLE BEE!!!! The dictionary tells us that to bumble is to stagger or to proceed in a hesitating manner . . . . and this is exactly what he does. He is a very large hairy, aerodynamically unstable insect who, unlike the honey bee, does not hover over the flower and then neatly land in the center of the floret that he intends to visit. Mr. Bumble Bee lands on anything convenient . . . leaves, buds . . . and walks on the foliage or anything handy as he goes from flower to flower. I have had one land on my hands as I was about to pollinate a flower, so he can't be very choosy. Big and hairy he is, for I have seen large bunches of pollen sticking to his hairy body. He is the first of the bee-type insects that I see in the spring. On Sunday, Feb. 20, I saw two of them. About 45° temperature and he is able to fly. . . . the warmer the temperature, the better he flies. For this reason, many plants in lovely bloom will appear on the next day all wilted and over . . . . the bees have pollinated and flowers have wilted. A brown paper bag with a twistem wound round the branch and a plastic bag, left open at the bottom, covering the blossom solves the problem of keeping out the bees. The plastic bag cannot cook the flowers and the paper bag cannot dissolve into a gooey mess if it rains.

The flowers that are to be used as the pollen parent also needs to be covered, or pollen from an unopened flower used. Pollen is easily saved or transported from one place to another by pulling out the anthers and putting them into an envelope. Though these should be open to the air, the envelopes can be carried in a handbag or pocket. The grains of pollen are held together with strands of a substance called *VISCIN* which is composed of many strands, very much like rope, measuring 1/2000th of a millimeter thick. For a long time it was thought that this viscin was merely a sticky substance like a spider web, but the strands are firmly attached to the pollen grains. The viscin causes the grains of pollen to adhere in great numbers to the body of an insect and to adhere to a receptive *stigma*. A stigma is said to be receptive when it exudes a sticky film on its surface. This syrup not only helps collect the pollen from the body of insects as they brush past to get to the nectar, but, also, helps to nourish the pollen as it grows down the pistil.

The typical grain of pollen contains a cell which, sooner or later, divides to form the male cell which is involved in fertilization. Rhododendron pollen is unique in that each "grain" consists of four cells called *MICROSPORES* instead of the common one-celled grain of many other plants. Such a group of four cells is called a *TETRAD*, so properly speaking, we should refer to them as *POLLEN TETRADS* and not pollen grains. This is characteristic of most members of the *HEATH* family of plants and helps explain why we can have 'Ledudendron Brilliant', a cross between *Ledum glandulosum* and *Rhododendron* 'Elizabeth'. Some of you may have seen 'Ledudendron Brilliant' in bloom in Jim Caperci's greenhouse when we picked up rhododendrons for the Plant Sale. It's bloom is as large as *R.* 'Elizabeth', slightly less red-colored, and with a bit less substance to the corolla. It has a normal-sized red-colored pistil and a black stigma that appears to be dry.

The anthers are very short. I fertilized the three flowers on this plant last year with pollen from three different rhododendrons and it appeared to be sterile, which is understandable since most offspring of widely separated parents are. I did not see any pollen, but I didn't really check carefully during the bloom period, so this is something to check this coming year.

The pistil has a canal down its center, running from the stigma to the ovary. In rhododendrons, this is not an open channel, but is instead an area where the cells are loosely built, leaving many intercellular spaces through which materials may easily pass. When a pollen tetrad is placed upon a receptive stigma and comes in contact with the sugary syrup, the pollen germinates and a pollen tube starts to grow heading down the stylar canal. The pollen tube develops from a small, sprout-like process into a single long, slender thread-like structure as it grows down the stylar canal toward the ovary. Near its lower end, the pollen tube carries the male cell and the vegetative nucleus.

Clement Bowers says, "That by microdissection and staining methods, I have been able to observe the progress of pollen-tubes down the style. In Rhododendron *maximum*, about 24 hours are required for the pollen tube to attain the complete length of the style at 68°F. Numbers up to several hundred pollen-tubes may pass down a style at one time, and these *need not* be of the same variety or species. In my opinion, it is entirely possible for one rhododendron flower to be successfully pollinated by several different kinds of pollen at once, and this is probably what happens when bees are pollinating flowers in a mixed collection of rhododendrons."

At the lower end of the stylar canal is the ovary, where the female or egg-cells are present. When the pollen-tube finally enters the ovule, the male nucleus is discharged and fuses with the egg nucleus forming the beginnings of a new rhododendron seed. Each ovary of a rhododendron may contain as many as 300 or 400 ovules and each ovule, if fertilized with the nucleus of a pollen-cell, eventually develops into a separate seed. Thus, every *seed* is a *separate individual* derived from the independent fusion of one definite male pollen nucleus and a definite egg nucleus.

To prevent self-pollinization, one must remove the anthers of florets to be fertilized. Many rhododendrons, hybrids in particular, mature pollen at greatly varying times during the blooming season. Five or six days before the flowers of *R.* 'Evening Glow' open, long strands of pollen ooze out of the apical pores and cover the stigma, which at this time is still as short as the anthers, not having grown as long as it will be by the time the flower opens. Using *R.* 'Evening Glow' as an example, the corolla and anthers must be removed early, at least a week before the flower opens and as soon as the bud is large enough to handle. If one wishes to pollinate only a floret or two, the remainder of the florets or pips can be cut off. Nor is it necessary to make the same cross on each floret. Each flower in a truss of twenty *could* be pollinated with different pollen. Care must be taken in marking and covering each fertilized blossom so as not to mix up the crosses. The attraction of pollen for stigma is much like we see in nature when static electricity is present. I would think that if one chooses to do this type of crossing a covering of aluminum foil or saran wrap for each stigma would be necessary, also, covering them with a paper bag. The saran could be removed safely in a week, to prevent mildew or molds.

On the other hand, according to the letter written by the late Mr. Lem to Mr. Ring as reprinted in the Jan. 1972 ARS *Bulletin*, evidently the stigma of the *R.* 'Anna' does not mature or become receptive until the corolla has fallen off or wilted, nearly two weeks after the initial opening of the flower. May I suggest that the letter be read or reread and if one has a plant of *R.* 'Anna', a bud be opened to see if any pollen is present before opening of the floret and truss. Also, the bud of an *R.* 'Anna' could be covered to see if pollen could be obtained as Mr. Lem suggested.

Quite by accident, since I knew little about *R.* 'Anna' other than it has been a noteworthy parent, I fertilized the stigma of *R.* 'Anna' with pollen from a truss of *R.* 'Albatross' that Mrs. Johnson had given us as we toured her garden last spring. The *R.* 'Anna's' that we bought for the sale were delivered with buds brown and dead; however, on one left-over plant, well

hidden by foliage, was a partially good truss that bloomed. This I pollinated. It is doubtful that Mr. Bee had been able to find these florets because I didn't even see them until they were almost gone. I attempted to cross *R.* 'Anna' with *R.* 'Betty Wormald', the closest thing to *R.* 'Marinus Koster' that I had. I thought that I was seeing pollen; evidently, I hadn't for no viable seeds were produced. I do have a few small seedlings of *R.* 'Anna' x *R.* Albatross' growing, though.

Certain traits of rhododendrons are dominant and certain are recessive. I would like to say something of my theory on inheritance of color, keeping in mind that there is always the chance for the BIG COLOR BREAK. The lavender and purple of certain of the very hardy species will carry through for many generations and muddy the colors; yellow, also, in some cases causes an unpleasant dilution of color. I'm sure all of us have been and will be victims of the EASTER EGG COLORING ORGY that goes on in about a month. The child looks at the beautiful sparkling reds and the sunshiny yellows, those lovely blues, and reasons, "If I mix them up my eggs will be much prettier than Melanie's." Not so! Generally, but not always, these eggs turn out to be dull, dingy gray with a hint of the other color.

After bagging the fertilized stigma, all that remains is to label the cross. The *female* or *seed* parent is noted on the label first as: (*R.* 'Anna' x *R.* 'Albatross'). The label is dated. If pollination is unsuccessful, one might want to repeat it the next year at a slightly different time. If the stigma doesn't appear to have been receptive at first, one might want to pollinize it again a day or two later, keeping covering bag in place until one is ready, to avoid unwanted pollen. If fertilization is completed, the corolla will wilt and fall off in a few days and soon the ovary will begin to swell. The bag may be removed safely at this time, and it is better to do so in order to avoid mildew in the damp close atmosphere. Along about November or December, the seed pod will be ready for harvest. As we look forward to the next blooming season for our rhododendrons, one may ask, "Why bother to hybridize; isn't it much simpler to buy the rhododendron desired at the Plant Sale or at a local nursery? Books can tell me exactly what it will be, the color, when it blooms, how tall it will be in ten years, whether it likes sun or shade and so on." In most cases, the answer is yes, but the rhododendron that one pollinates and then grows on from seed will be different from any other rhododendron in the whole UNIVERSE. It is impossible for any one person to raise more than a few generations of rhododendrons in his life time. A labor of love such as hybridizing rhododendrons will not make him rich if he breeds a winner. His fame will only be known to a few rhododendron buffs. He will, however, probably have a large trash pile of cast-off plants, not worthy of future growing. In the Pacific Northwest, where many of our newer hybrids were bred, many of the pioneers have passed away in recent years. We need more persons involved in hybridizing. IN THIS DAY OF THE GREAT WOMEN LIBERATION MOVEMENT!! . . . WHY NOT A FEMALE HYBRIDIZER?? Hybridizing rhododendrons does not demand any special talents that a woman does not possess. How much strength is required to carry a bit of pollen that even a bee weighing a few grams can manage?? Traditionally, women are more observant of color, grace and form than a man . . . . so let's have more hybridizing done!

MARTY McBRAYER

Part II

The rhododendron plant and flower consist of large numbers of cells, each cell containing a nucleus, each nucleus containing a number of chromosomes on which occur the genes. It is these genes which determine every characteristic of the plant. The chromosome compliment of each nucleus shows two identical-looking sets, but these sets are different because one set comes from the pollen-parent and the other set from the seed-parent. Most rhododendrons have thirteen chromosomes from each parent; therefore they have a chromosome number of twenty-six. Occasionally, rhododendrons do have four sets or fifty-two chromosomes or six sets with

seventy-eight and rarely, thirty-nine chromosomes. Plants having odd numbers of chromosomes are usually sterile or produce sterile hybrids. This number of chromosomes is important to the hybridizer for those rhododendrons with the thirteen pairs of chromosomes do not cross readily with those varieties having a greater number than twenty-six. Some of the experts feel that the best chance of inducing a cross between species with dissimilar chromosome numbers will come if the plant with the larger chromosome count is used as the pollen parent. In some past rhododendron literature, lists of the chromosome counts of certain series have been published. If one has had difficulty in getting viable seed from a particular cross, this could be one factor to check. Briefly, here are a few of the species with higher than normal chromosome count:

R. augustinii .....52 chromos.
R. davidsonianum 78
R. russatum .....52 or 78
R. diaprepes 39
R. cinnabarinum 78
R. maddenii .....52 or 78
R. xanthocodon 78
R. manipurense 156

Does this account for the rather easy crossing of *R. augustinii* and *R. russatum*, or the *R. cinnabarinum* x *R. maddenii* which resulted in *R.* 'Royal Flush' and, indirectly, in the *R.* 'Lady Chamberlain' and *R.* 'Lady Rosebery'?

Some naturally doubled chromosome counts appear in azaleas as well as the other rhododendron series. Experimenting is being conducted using colchicine, a poison, to artificially double chromosomes in rhododendrons. If a plant is sterile because of the odd-numbered chromosomes, this colchicine treatment might make it fertile and capable of further hybridization. In these doubled forms, or tetraploid plants, the leaves and flowers are larger with a heavy texture. They appear more vigorous and may have increased hardiness. Fine genes to pass on!

Another factor to be considered when planning a cross is the presence or absence of scales. The rhododendron family is divided into two groups, those with scales (lepidotes) and those without scales (elepidotes). The two groups do not hybridize easily, although there are two registered hybrids, at least.

The first recorded hybrid was an azaleadendron, an accidental cross occuring in about 1800. The parents were *R. ponticum* and a deciduous azalea, *R. nudiflorum*. Azaleas are non- scaly, yet it is a wide cross to have been successful. Mr. Martin of Los Gatos, Calif. began a project in 1955 to produce azaleadendrons by crossing evergreen and deciduous azaleas with "true" rhododendrons in an attempt to breed a yellow-flowered azaleadendron. He made about 670 crosses but most of them died or were too feeble to retain. One result did tell him that the deciduous azaleas hybridized much more readily than did the evergreen kinds with rhododendrons. Many of the seedlings were albino with about one dark green seedling in several thousand. His only yellow-flowered success was a cross of *R.* 'Little Pudding' with an Exbury azalea, made in 1963. Perhaps, we will hear more of this plant in the future. During his first few years, Mr. Martin made reciprocal crosses, but after 177 pollinations, he found that transferring pollen from rhododendron to azaleas was largely negative. Discontinuing this tact, he confined the transfer of pollen from azalea to rhododendron. Our West Coast *R. occidentale* appears to be one of the easier and best azaleas to hybridize.

Gregor Johann Mendel, an Austrian monk and naturalist, established a "law of heredity" in the 1900s. It says, "the offspring is not intermediate in type between it's parents, but the type of one or other parent is predominant". Lionel de Rothschild indicated in a 1940 letter to the late Herb Ihrig that primary crosses between two species will give intermediate results but that a hybrid crossed to a hybrid follows Mendel's law. He thought that the crossing of two hybrids nearly always reverts to a dominant type and is *not* recommended. He regretted hybrid crosses and had most of his burnt! Rudolph Henny, probably the most prolific American hybridist, stated that Mendel's law is tricky and appears fraudulent especially in first generation hybrids, but upon back-crossing or re-crossing two sister seedlings, Mendel's law *(continued on p. 21)*

View of part of landscape tree trials at Aurora, Oregon. From left, paper birch (*Betula papyrifera*), hedge maple (*Acer campestre*), *Liquidambar styraciflua* 'Sunset'.

Landscape Tree Evaluation in Oregon

*R. L. TICKNOR**

A Tree Evaluation program was started at Oregon State University's North Willamette Experiment Station near Aurora in 1965. Goals of this program were to determine the rate of growth in height and width and to observe the dates of foliation, flowering, fall color and defoliation. Observations have also been made on the amount of injury caused by cold, disease, insects, and wind on the trees in the trial.

Over three hundred selections of deciduous and evergreen trees have been tried to date. Since the two arboretums in Oregon, the Hoyt Arboretum in Portland and Peavy Aborteum in Corvallis, feature conifers none of this group have been planted. Also because of the extensive collections of flowering crab apples, flowering cherries, and English holly varieties at Oregon State University Lewis-Brown farm at Corvallis, only one crab apple and two cherries have been planted in the trial.

Landscape performance of thirty-six of the most interesting trees selected for growth habit, flowering, and fall color are given in Table II. To learn more about some other trees that have been tried, a "Circular of Information 633" which lists the four-year performance of 237 selections, is available from the Bulletin Clerk, Department of Printing, Oregon State University, Corvallis, Oregon 97331.

Table II groups the trees by expected mature height and records the scientific name, common name, ultimate height, height and width at planting, and height and width after five growing seasons. E (early), M (mid-

*Dr. Ticknor is Professor of Horticulture and Director of the North Willamette Experiment Station, Oregon State University, Aurora, Oregon.

Upright European hornbeam (*Carpinus betulus* 'Fastigiata') at Aurora, Oregon. Planted 1965.

season), and L (late) are used to indicate the relative times of foliation, bloom, fall color, and defoliation. Table I provides the dates on which the symbols used were based. The symbols E, M, or L are included in the bloom column only if the tree bloomed within the five-year trial period. A symbol in the fall color column indicates the color is worth noting.

In the shortest group, ten to twenty feet, we have chosen the Globe Norway maple and the 'Betty' Magnolia. The Globe Norway maple has a dense sheared look without the effort of pruning. Birds prefer this tree as a nesting site but unfortunately aphides prefer it as a feeding site. The 'Betty' Magnolia which is really a large shrub rather than a small tree has been one of the best flowering of the eight selections *(Magnolia stellata* x *M. liliflora)* from the U.S. National Arboretum at our location.

In the twenty to thirty foot height category, a wider choice of trees is present. For fall color one might choose the Paperbark or Purpleblow maples, Chinese Dogwood, Crepe Myrtle, or the 'Amanogawa' flowering Cherry. For bloom after the spring peak the Chinese Dogwood, Golden-rain Tree, Crepe Myrtle, or Japanese Tree Lilac might be a choice. The two eucalyptus provide evergreen foliage in an area where the temperature doesn't drop below 8°F. The Spinning Leaf Snow Gum if it is cut back to three feet each spring will continue to produce its round leaves which are prized for flower arrangements. The 'Amanogawa' flowering Cherry adds an interesting vertical accent to the landscape.

We list only three flowering trees in the thirty to fifty foot category, all of which are relatively slow growing. Of the *Cercis* or Redbud species the European Redbud *(C. siliquastrum)* has grown and flowered the best for us. Two white flowering selections of *Cornus florida* have been very good. 'Cloud 9' is outstanding for flower production, particularly as a young plant, while 'Rainbow' with its yellow and green leaves provides a color accent throughout the growing season and both have excellent fall color.

A number of outstanding trees in the fifty to seventy-five foot size are large enough to provide shade for homes and yards. The first tree to develop fall color each year is 'Autumn Flame,' a round-headed selection of *Acer rubrum*. Other outstanding trees for fall color are the Oriental Sweet-gum in pastel shades and the brilliant Scarlet Oak. *Cornus nuttallii* 'Goldspot' and *Stewartia pseudocamellia* have good fall color but were chosen for their flowering as well. Two evergreen oaks will provide year around shade in all but the coldest winters. If one is really interested in shade the Live Interior Oak grows faster but the Cork Oak does have interesting bark. The upright European Hornbeam provides a vertical accent, while the 'Village Green' *Zelkova* has a wide spreading, flat-topped habit, and finally, a weeping habit characterizes the Niobe Weeping Willow.

Moving up the ultimate height scale to seventy-five to one hundred feet we find two birch species with outstanding white bark: the Monarch and Paper Birches which have had less troubles with insects than the more common European White Birch. The evergreen trees are represented by the Cider Gum

whose leaves are good for flower arrangements and the St. Mary's variety of the Southern Magnolia. St. Mary's blooms younger and is hardier than most Southern Magnolias we have tried. For summer foliage color one might choose the 'Crimson King' Norway Maple but for fall color the 'Emerald Queen' Norway Maple and 'October Glory' Red Maple are better.

Foliage color would again be one of the reasons for picking one of the three trees that are expected to grow taller than one hundred feet. The Sunburst Honey-locust provides a yellow accent during the spring and early summer. Outstanding red fall foliage is found on 'Red Sunset' maple. The fall foliage on the 'Armstrong' maple isn't as bright but the growth habit is a narrow column which can be used in landscaping.

TABLE I. DATES[1] OF GROWTH EVENTS IN LANDSCAPE TREES AT NORTH WILLAMETTE EXPERIMENT STATION

	Early	Mid-Season	Late
Foliation[2]	2/26- 3/31	3/26- 4/28	5/15- 5/27
Flowering	2/26- 3/25	3/26- 5/23	5/27- 8/25
Fall Color[3]	9/3- 9/29	10/2-11/3	10/28-12/15
Defoliation[4]	10/12-11/5	11/10-12/8	12/5 and after

[1]These dates represent the extremes for an 8-year period, 1966-1973, thus there is some overlap as a growth stage may vary 2 to 4 weeks from year to year.
[2]When first true leaf is visible.
[3]Start of fall coloration.
[4]Complete defoliation.

TABLE II. LANDSCAPE PERFORMANCE OF SELECTED TREES IN SEVERAL HEIGHT CATEGORIES AT NORTH WILLAMETTE EXPERIMENT STATION, AURORA, OREGON

	Height			Width		Time[1]				
Botanical and common name	Ultimate height	At planting	After 5 yrs.	At planting	After 5 yrs.	Foliation	Bloom	Fall color	Defoliation	Remarks
TREES 10-20 FEET										
Acer platanoides 'Globe' Globe Norway Maple	20	6.3	11.1	1.0	6.9	M	M	M	M	Very dense globe shape.
Magnolia x 'Betty' Betty Magnolia	15	0.7	6.8	0.5	4.4	M	M		M	Flowers orchid outside, white inside. One of most floriferous of U. S. Nat'l Arboretum varieties.
TREES 20-30 FEET										
Acer griseum Paperbark Maple	25	2.5	8.1	1.6	4.4	M		M	M	Interesting peeling bark. Very good red fall color.
Acer truncatum Purpleblow Maple	24	2.7	9.3	1.5	9.8	M		M	M	Good red fall color.
Cercis siliquastrum album White Judas Tree	30	2.9	9.6	2.5	6.2	M	M	M	M	White pea flower. Pale green new leaves.
Cornus kousa chinensis Chinese Dogwood	21	5.3	11.0	2.3	5.4	M	L	E	M	White flowers in June. Good red fall color.
Eucalyptus niphophila Snowland Eucalyptus	20	1.1	15.3	0.9	13.5	M				Evergreen. Gray foliage. Hardiest eucalyptus in trial. Killed to ground by extended 5°F.

TABLE II. continued

Botanical and common name	Ultimate height	Height: At planting	Height: After 5 yrs.	Width: At planting.	Width: After 5 yrs.	Foliation	Bloom	Time[1]: Fall color	Time[1]: Defoliation	Remarks
Eucalyptus perriniana Spinning Leaf Snow Gum	27	3.6	23.6	1.9	16.4	M	E			Only minor foliage burn at 8°F. Grey green evergreen leaves. Killed to ground by extended 5°F.
Koelreuteria paniculata Panicled Goldrain-tree	30	2.2	8.9	1.7	9.0	E	L	L	M	Yellow flowers in summer. Interesting inflated seed pods.
Lagerstroemia indica Crepe Myrtle	21	5.8	8.9	2.5	4.5	L	L	M	M	Bloom in late summer. Good red fall color. Slight twig dieback in cold winters.
Magnolia x 'Dr. Merrill' Dr. Merrill Magnolia	20	1.7	8.8	0.3	5.7	M	E		M	Heavy-blooming white.
Prunus serrulata 'Amanogawa' Amanogawa Flowering Cherry	20	6.9	14.1	0.4	3.4	M	M	M	M	Columnar white-flowering tree. Good red and yellow fall color.
Syringa amurensis japonica Japanese Tree Lilac	30	3.4	9.2	0.6	4.6	E	L		E	Late white flowers. Bark cherry-like.
TREES 30-50 FEET										
Cercis siliquastrum Judas-Tree	30	5.3	15.6	3.8	13.2	M	M		L	Purplish-pink pea flower. Reddish-green new leaves.
Cornus florida 'Cloud 9' Cloud 9 Flowering Dogwood	40	2.7	8.1	1.5	5.5	M	M	M	M	Best white-flowered variety in trial. Very good red fall color.
Cornus florida 'Rainbow' Rainbow Flowering Dogwood	40	4.0	5.9	1.7	4.5	M	M	E	M	Yellow and green leaves changing to orange and red in fall.
TREES 50-75 FEET										
Acer rubrum 'Autumn Flame' Autumn Flame Red Maple	60	6.3	15.6	1.1	12.5	M	E	E	E	Round-headed tree with excellent red fall color. First tree to color.
Carpinus betulus 'Fastigiata Upright European Hornbeam	70	5.0	20.0	0.5	5.0	E		M	M	Upright habit. Yellow fall color.
Cornus nuttallii 'Goldspot' Goldspot Pacific Dogwood	75	5.0	10.3	2.1	6.5	E	M&L	M	L	Blooms April and August. Yellow-spotted leaves which become red in fall.
Liquidambar orientalis Oriental Sweetgum	60	3.6	9.9	1.9	6.0	E		M	L	Pastel yellow-orange fall color.
Quercus coccinea Scarlet Oak	75	4.9	21.7	1.1	11.7	L		M	L	Very good red fall color. Holds leaves.
Quercus suber Cork Oak	60	1.3	7.0	0.3	7.2	L				Evergreen. Defoliated but not killed at 5°F.
Quercus wislizenii Interior Live Oak	70	3.0	14.4	0.8	12.6	M				Evergreen. Slight dieback at 8°F. Partially defoliated by extended 5°F.

TABLE II. continued

Botanical and common name	Ultimate height	Height: At planting	Height: After 5 yrs.	Width: At planting.	Width: After 5 yrs.	Foliation	Bloom	Fall color	Defoliation	Remarks
						Time[1]				
Salix alba tristis Niobe Weeping Willow	75	3.9	21.9	1.4	25.4	E		L	M	Wide-spreading and fast growing. Yellow twigs and fall color. Size at 4 years.
Stewartia pseudocamellia Japanese Stewartia	70	3.5	9.8	1.8	4.9	E	L	E	M	White flowers June-July. Good red fall color.
Zelkova serrata 'Village Green' Village Green Zelkova	75	6.5	16.8	5.3	16.4	M		M	L	Interesting bronze fall color.
TREES 75-100 FEET										
Acer platanoides 'Crimson King' Crimson King Norway Maple	90	6.1	16.4	0.0	7.6	M			M	Red foliage all summer.
Acer platanoides 'Emerald Queen' Emerald Queen Norway Maple	90	7.3	23.0	0.0	12.2	M	M	M	M	Good yellow fall color.
Acer rubrum 'October Glory' October Glory Red Maple		6.1	18.6	2.1	10.1	M	E	M	M	Very good red fall color on oval-shaped tree.
Betula maximowicziana Monarch Birch	90	5.4	13.3	1.4	7.3	M	E	E	E	Yellow fall color. Creamy white bark in fourth year. Less leaf miner damage than European White Birch.
Betula papyrifera Paper Birch	90	6.0	9.3	1.9	8.5	M	M	E	E	Good yellow fall color. White bark 4th year. Less leaf miner damage than European White Birch.
Eucalyptus gunnii Cider Gum	90	1.8	27.0	1.6	17.0	E				Blue-green leaves. Top injury 8°F. Killed to ground at 5°F.
Magnolia grandiflora 'St. Mary' St. Mary Southern Magnolia	90	2.2	7.5	1.0	6.6	L	L			Evergreen. White flowers. Blooms soonest after planting of M. grandiflora varieties.
TREES OVER 100 FEET										
Acer rubrum 'Armstrong' Armstrong Red Maple	120	4.8	25.5	1.0	6.9	M	E		M	Upright habit.
Acer rubrum 'Red Sunset' Red Sunset Red Maple	120	5.7	22.3	2.3	11.2	M	E	E	M	Good red fall color.
Gleditsia triacanthos 'Sunburst' Sunburst Honey-locust	135	7.8	13.7	2.0	10.6	L	L	M		New foliage yellow, turning green later. Yellow fall color.

Autumn Walk in a Japanese Garden

Clean air after soft rain.
Gravel crunching underfoot.
Scotch and Japanese pines,
Living sculpture.

Great grey stones by the path.
Red leaves beside still water.
Lily pads on the pond,
Above pied fish.

Some trees clouds of color.
Bridges made of wood or stone.
Soft grey sky overhead,
Stirred by the wind.

One day of an Autumn.
Segment of an afternoon.
A garden without flowers,
Where fishes live.

MIKE FOWLER

Syringa amurensis japonica 6-15-71

Acer rubrum 'October Glory' 10-25

Seven Landscape Trees — Bloom, Fol

Photos: Dr. Ticknor

Quercus coccinea 11-12-68

Cornus florida 'Rainbow'
Photo: Frank Schmidt

Acer rubrum 'Autumn Flame' 10-15-74

Betula papyrifera 10-16-74

iage, Form

Cornus florida 'Rainbow'
Photo: Frank Schmidt

Cornus florida 'Cloud 9' 5-71

University of Washington Arboretum Classes — Winter, 1975

BIRD IDENTIFICATION FOR BEGINNERS. Merilyn D. Hatheway, experienced birder, will conduct a field class with emphasis on land birds commonly found in the Arboretum and waterfowl on Lake Washington. Binoculars required; appropriate clothing and boots recommended. Class limited to 15; meet at Arboretum office. Saturdays, Jan. 18, 25, Feb. 1, 8, 15, 22; 9-11 a.m. 6 sessions, $15.

WINTER PROPAGATION. Mr. Richard van Klaveren, Arboretum propagator, will teach techniques for propagating woody plants, including cutting and seeding. Arboretum greenhouse; class limited to 10. Saturdays, Jan. 11 & 25; 9-12 noon. 2 sessions, $10.

GRAFTING ORNAMENTALS. Mr. van Klaveren will instruct in techniques for grafting woody plants. Materials will be furnished. Arboretum greenhouse; class limited to 10. Saturdays, Feb. 8 & 22; 9-12 noon. 2 sessions, $10.

HOUSE PLANTS. Mr. van Klaveren and Dr. William Hatheway of the Arboretum staff will discuss indoor plants. Topics covered will include houseplant identification, care, and techniques of propagation. Materials will be furnished. Arboretum greenhouse; class limited to 15. Saturdays, March 1 thru 22; 10-12 noon. 4 sessions, $15.

TO REGISTER: Send checks made payable to the University of Washington to: Arboretum Courses, Anderson Hall (AR-10), University of Washington, Seattle, WA 98195.

FOR FURTHER INFORMATION: Call 543-2730.

Edmonds Community College Courses

WINTER PLANT IDENTIFICATION (Horticulture 107; 4 credits). Ornamental conifers and dormant twig and bud identification of the major deciduous tree genera are covered. (Wednesdays: 6:30 to 10:20 p.m. and alternate Saturdays 8:00 a.m. to 12:00 p.m.)

GREENHOUSE MANAGEMENT (Horticulture 145; 3 credits). How to maintain and operate a greenhouse for maximum efficiency: heating, cooling, watering, fertlizing systems and materials are dealt with in this course. (Mondays: 6:30 to 10:20 p.m.)

PRUNING (Horticulture 170; 2 credits). The tools, theory and techniques of pruning fruit and ornamental trees and shrubs. (Saturdays: 8:00 a.m. to 12:00 p.m.; two five-week sessions: January.)

For further information on these courses or daytime courses please contact the Horticulture Department at Edmonds Community College — 775-3511.

This is your Arboretum, kept alive by your support

We are pleased to welcome the following new members (July 1, 1974 through September 30, 1974):

Sustaining — Bovees Nursery, Captain & Mrs. Harald Fritzner. *Annual* — Mrs. Vernon G. Anderson, Mrs. Douglas R. Bailey, Mrs. Jon Bayley, Mrs. Art Bottman, Mrs. James Clark, Mrs. David Covey, Miss Maruja Cruz, Mrs. Richard Day, Mrs. Jerome Ellering, Mrs. Dennis Burke Elrod, Mrs. Donald S. Gellatly, Mrs. John P. Greeley, Mr. and Mrs. Elton C. Gildow, Mrs. Roger Gotteland, Mrs. Wheeler Grey, Mrs. Steven V. Guzale, Jr., Mrs. J. Harry Hamilton, Roy D. Harsh, Mrs. Laura Hartstein, Mrs. W. Stockton Higgins, Mr. and Mrs. Rodman Lent Hooker, Jr., Mrs. Ronald Jamieson, Mrs. Devere Leo, Mr. and Mrs. Michael Masi, Mrs. Don McConnaughey, Mrs. Terry Miller, Wayne M. Miller, Mr. Louis Opfer, Mr. and Mrs. Simon Ottenberg, Mrs. Michael G. Owen, Mrs. Lloyd Peek, Mrs. Conrad J. Rauch, Mrs. Louis Reynolds, Mrs. Henry G. Schulte, Mrs. Nathan Serale, Mrs. Jan Erik Skugstad, Mrs. Laurel Smith, Thomas David Stimson, Mrs. James D. Swanson, Irene L. Thannum, Mrs. James Todd, Mrs. Frederick D. Wagner, Dr. N. Dean Weaver, Mrs. Barbara A. Wotipka.

We are also grateful to the following who have increased their dues to: *Contributing* — Dr. Almon S. Fish, Jr., Mrs. H. E. McCray, Mrs. Frank Thorne. *Sustaining* — Mrs. W. G. Hiltner, Mrs. H. E. Stack.

Photo: J. A. Witt

Arboretum Spotlight

A Hybrid Pine,
Pinus monticola x *P. wallichiana*

The genus *Pinus* (pines) is an ancient group of trees and shrubs found growing throughout the northern parts of the world. Over one hundred species have been recognized by botanists, and their taxonomy or identification is not easy; this despite the fact that nearly everyone with the least interest in their surroundings can recognize a pine tree. Man and pines have a long and intertwined history, probably mostly to the detriment of the pines. Because of their economic importance as timber trees, a source of resins and a food source (pine nuts), the genus has received a good deal of attention from scientists in the past fifty or so years, and some attempt to improve the trees has been made through artificial hybridization. Perhaps the leading institution doing breeding work on pines is the Institute of Forest Genetics in Placerville, California, operated by the U.S. Forest Service. The Arboretum has been the recipient of a number of hybrids made there, and several seem to have promise either as good trees or for potential use in the forest industry. They also have some promise to forest geneticists and plant breeders for future studies and research.

The Arboretum received scions of this hybrid in 1958, and they were grafted on *Pinus strobus*, eastern white pine. One was planted in a dry sunny location north of the nursery in 1962 when it was three and one half feet tall. This tree is now 23 feet high, for an annual growth rate of about 19 inches a year. Actually, growth for the last three or four years has been closer to two or three feet annually, a very respectable rate indeed. Another plant of the same stock was set out three years later and is doing equally well.

The two trees are similar in general appearance to the native western white pine; rather open of habit with soft blue-green needles

up to 5 inches long. They coned at a relatively young age—less than 10 years—and the cones are very handsome, 8 to 10 inches long hung in clusters of two's and three's at the end of the branches, and appear to be quite intermediate between those of the two parents.

Attractive as it is, this hybrid pine is not going to be too useful as an ornamental tree since it will obviously grow much too large for the average garden. Potentially it could be over 100 feet tall. It is of very considerable interest, however, to students of plant geography since it represents the crossing of two pine species whose natural habitats are separated by some 7,000 miles of land and ocean. This seems strange since the western parent, *P. monticola*, will not freely cross with the closely related sugar pine *P. lambertiana* which grows in the same geographical area.

The hybrid may also prove to be of some value to the forest industry since it has such a fast growth rate. This is not probable in the immediate future, however, since producing hybrid forest trees is not quite the same as producing hybrid corn, and special techniques would be required to obtain the quantity of trees for reforestation purposes.

Regardless of future uses this pine is one we will watch with great interest and perhaps spotlight again in the future.

J. A. WITT

SOME OF OUR FAVORITES
Won't You Send Us Yours?

NEW WRITERS WANTED!
Wouldn't You Like to Appear in Print?

"Some of our Favorites" has been a *favorite* column of our readers for a long time. Some sixty-one favorite plants have been written up by fifty-four persons, mostly Foundation members. A file of previous "Favorites" is available in the Office.

An article may consist of approximately one or two columns—three hundred to six hundred words, or as many words as is necessary to describe your "Favorite." It should include the scientific names, i.e., Genus and Species (and their meaning), varieties if you like, and possibly the plant family to which it belongs. It would be of interest to find out the country or place of origin if possible. Local or common names can be given, as well as any historical "lore" associated with it.

Your description should tell the readers why it is your favorite. Is is easily grown and under what conditions? Have you had any experience with growing it from seeds or cuttings or layerings? What care must it have and with what other plants does it like to associate? Does it have "enemies"—insect, animal or viral and how hardy is it supposed to be?

If it is a native it will be interesting to know where you collected it and under what conditions. The Plant Study Sheet reproduced at the end of this article and used by the Study Groups is a good guide in describing and writing up your choice.

Many fine books are available for learning about your plant. Suggested books for the "beginner" to use might be some of the following: Sunset *Western Garden Book*, Wyman's *Gardening Encyclopedia*, Hillier's *Manual of Trees and Shrubs*, Lyon's *Trees and Shrubs to Know in Washington*, Hitchcock and Cronquist's *Flora of the Pacific Northwest* and Gilkey and Dennis's *Handbook of Northwest Plants*.

May Guy

Plant Study Sheet

Botanical Name _____
Genus Species Variety
Family Name _____
Common Name _____
Native Habitat _____
General Description _____
Special Feature _____
Size _____
Leaves _____
Flowers _____ Blooming Date _____
Fruit _____ Fruiting Date _____
Location _____
Hardiness _____
Pests and Diseases _____
Propagation _____
Culture _____
References _____
Source _____ When _____
Special Note _____

Our Readers Write . . .

The Editorial Board again shares with you excerpts of correspondence from our readers from afar and from nearer at home. We hope that you enjoy reading their comments. If you should care to share reactions to an article or experience we should be happy to hear from you.

In a letter to Mr. Witt, Fred C. Galle, Director of Horticulture, Callaway Gardens, Pine Mountain, Georgia writes:

In the spring issue of the Arboretum Bulletin I noted your article on *Rhederodendron macrocarpum* and it sounds like a very exciting plant. Hopefully, we will have an opportunity to get a plant on this kind in the future . . . I don't think we related how much we enjoyed getting the bulletin. I think it is one of the fine publications in the Arboretum areas and the spring issue was exceptionally good with diversive coverage and the extra edition of color pictures on the inside. Keep up the good work!

Acknowledging his thanks for last year's Bulletins, our friend Roberto Tamara, Head, Documentation Service at the Institute of Conservacao, Rio de Janeiro-Guanabara comments:

It may be agreeable for Prof. Dr. B.J.D. Meeuse to hear that his two-part article on "Seeds and Fruits and their Dispersal Strategies" has been read, with enormous interest, by the most students of the Rio de Janeiro University's Biological Department . . . Very interesting is also, among the others, the book review on "Indian uses of native plants."

Our Readers Write . . .

(continued)

In thanking the Board for printing Edmonds Community College Courses, Walter F. Bubelis, Instructor in Horticulture, writes:

I am glad that our common endeavor is to make more people knowledgeable in the field of horticulture. If the concern for our environment is not to be a passing fad, interest with the necessary background must sustain this effort . . . I pass new issues around the class when they arrive and often put certain articles on reserve reading.

Of special interest and with great gratitude we acknowledge the following contribution from Mrs. V. de Salvatore, Chairman of Unit No. 70. We hope they are pleased with the color spread in this issue. They helped to make it possible!

Enclosed is a donation of fifty dollars ($50.00) from Lakeview Arboretum Unit No. 70 for the promotion of colored photographs in the Arboretum Bulletin.

From Mrs. Holden of Holden's Nursery, Kirkland, Washington:

It was a lovely write up on the flowering Crabapples in the latest issue of the Arboretum Bulletin . . . I do not drive and since I cannot get away to see the beauty of the Arboretum I have to rely on the Bulletin, so make it colorful and keep it interesting.

From Chloe Sivertz, formerly Northeast Representative for the Foundation Unit Council:

I have long held the Arboretum Bulletin to be the number one periodical for northwest gardeners. During my years of work in the Art department of Seattle Public Library I found it to be extremely useful; we used the index constantly and needed copies for circulation as well as for the reference file. The articles by local as well as other experts have always been of high quality.

An outstanding contribution to the spring 1974 issue was the paper by Mrs. Milburn . . . I found this paper particularly helpful in explaining to others the scope and activities of our Arboretum.

The recent innovation of the color pages adds tremendously to the beauty and interest and helps in identifications . . . We enjoy the Arboretum Spotlight, the reports from travelers, Favorites, all botanical articles; indeed, we read the Bulletin from cover to cover!

The Board thinks that you may be interested to know that requests for subscriptions or exchanges have recently come from **Latvia, U.S.S.R.; Forestry Library, Hokkaido University, Sapporo, Japan,** *and the* **Library of the Goulandris Natural History Museum in Kifissia, Greece.**

SUPPORT
YOUR ADVERTISERS

Hybridizing *(continued from p. 8)*
does apply. So these two experts agreed upon the point of inheritance, in dominance and recessiveness of both hybrid crosses and in species bred to hybrids. I will mention their point of disagreement in a moment. We know that the earliest hybrids made in England used *RR. catawbiense, ponticum* and *maximum* and we know that these species proved dominant in passing on traits such as hardiness, blue tones, blotches and rather large foliage.

One of the rarest phenomenons of dominance occurs when one of the parents dominates the cross in *every* respect. This is called apomixis. When a plant reaches blooming size and it is discovered that it is identical to it's seed parent, apomixis has resulted. Seed has been produced without fertilization. The female parent is stimulated to bear seeds by the application of pollen which fails actually to fuse with the ovules so that seeds resulting have no genes from the male parent and must, therefore, duplicate the mother plant.

It is probable that we should have some goals in mind before hybridizing. Thoughtful selection of parents might save some wasted years bringing to flower stupid crosses. I have some stupid crosses, one of which began to bloom for me two years ago. Simply because I wished to try my hand at hybridizing and two rhododendrons were in flower at overlapping times, I crossed *R.* 'CIS' and *R.* 'Jingle Bells'. *R.* 'CIS', the seed parent, is (*R.* 'Loder's White' x 'Fabia') and the pollen parent, *R.* 'Jingle Bells', is (*R.* 'Ole Olson' and *R.* Fabia'). The first seedling out of group to bloom produced pedicils 3″ long with long tubular bells hanging from their tips. My daughter was impelled to say, "Mom, that's ugly", when she saw the brick red blossoms slowly turning to a cream color. She was right, but that was one of my "babies" that she was deriding. If I had known enough to research the parentage, I might have guessed that there would be too much *R. dichroanthum* in this cross, since *R. dichroanthum* is a strong dominating parent which is inclined to produce excessively long pedicils, making very loose trusses. I guess this is the shotgun approach. Opinion forty years ago dictated that color should be bred to like color and that one parent in every cross, at least, should be a species. Doubling up the color chromosomes has increased the depth, brilliance and clarity of modern rhododendrons. However, Rudolph Henny has stated that he wasted years hybridizing nice, uniform, slightly improved forms breeding "like" species. Examples were *R. haematodes* x *R. chaetomallum, R. neriiflorum* x *R. euchaites,* and *R. croceum* (now merged with *R. wardii)* x *R. campylocarpum.* There were no bad plants but there were, also, few color breaks and no unusual combinations of characters. Perhaps, we can conclude that the work of the pioneer hybridizers has done the basic homework for us if we are clever enough to study their results. From the American Rhododendron Society and Royal Horticulture Society Registers, we can learn what rhododendron combinations have been made already. We can select plants that have the characters that we desire and cross or back-cross them. The complex hybrids of today offer unlimited possibilities for grouping and regrouping their genes to create exotic, hardy rhododendrons that may be undreamed of at the present time. Most of the seedlings from such complicated hybrids and very wide crosses will be worthless. Guy Nearing has been quoted as saying that a hybridizer is only as good as his ability to "throw away". He concluded that it might require 10,000 seedlings to create one superior and unique rhododendron. Sometimes, it seems that we learn by doing the "what-not-to-dos", the negative approach.

Of the 1,000 or so species in cultivation, only a relatively small number of them have been used in hybridizing. Many of the same varieties have been used over and over. There are untried and potentially interesting species available for those of us who like to work with the wildlings, particularly in the dwarf rhododendrons.

Mr. Henny joked about "tossing Mendel's hat" when advocating the wide crosses. Often, these hybrids will be sterile because they develop incomplete form or flower parts. Mr. Henny bred a number of so-called "mules", trusses with florets lacking stamens, usually. *R.* 'Fair Lady' is one of them; Ostbo's *R.* 'Mary McCarty' is another. These two rhododendrons do not represent crosses too wide, but I have heard Mr. Lem's hybrid *R. calophytum* x

repens termed the "elephant and mouse" cross. When these incomplete florets lack stamen, they cannot become pollen parents, but they can be used as seed parents. They often produce viable seed capsules. As garden plants, they cannot accept pollen; therefore, florets and trusses last a long time. Ben Lancaster called these the "maiden ladies" because their floral beauty lasts so long.

There is no single gene for beauty; thus we try to combine genes to fashion gorgeous flowers on beautiful-foliaged plants. Discovering the parentage of favorite hybrids that we might like to use to meet these goals is fun and sometimes surprising. Many of the most desirable genes are *recessive.* It took years and generations to produce a lovely yellow rhododendron such as *R.* 'Crest' and *R.* 'Full Moon'. Indumentum and scent must be recessive for they disappear in first generation crossing unless both parents have indumentum. How many true blues and oranges are to be seen? How many true reds in the lepidote series? Are there any true double florets? These true colors will come in time, plus many other improvements, but it may take more than a lifetime to combine the proper parents, forcing recessive genes to emerge. Another confusing factor is that of *linkage.* Certain recessive genes emerge only in certain combinations . . . . two or more genes traveling together. At present, we do not know which of these genes are linked or how to deliberately trigger them into dominance.

Backcrossing has been neglected until recent years, yet backcrossing is one way to double desirable chromosomes. Crossing two selected sister seedlings can often recover those recessive genes, too. One should look to the filial generation 1 or F2 groups to produce the goals that the hybridizers of the past were trying to achieve. One of the American award winners, *R.* 'Trude Webster', is selfed, or backcrossed. Mr. Greer selfed *R.* 'Countess of Derby' and raised this rhododendron, *R.* 'Trude Webster', which won the highest award that the American Rhododendron Society gives. Selfing has been found to sturdy up a plant sometimes as with some of the *R. griersonianum* siblings. Occasionally, rhododendrons will not accept their own pollen and this is where crossing sister seedlings may provide the desired results. *R. yakusimanum*, F.C.C., has been reported as unwilling to accept it's own pollen. I have tried to self *R. roxieanum* var. *oreonastes* and failed, but I shall try again.

Recently, I asked a commercial grower if he thought it made any difference which rhododendron is chosen to be the seed parent. He answered that he did not think it mattered. However, reciprocal crosses are often recommended. Ben Lancaster was one who might have disagreed or qualified this opinion. He wrote that reciprocal crosses, *generally*, develop plant forms and growth habits resembling the seed parent. *R.* ('China' x williamsianum) was one of his examples. He maintained that using *R.* 'China' as the seed parent resulted in taller growing plants than when he used *R. williamsianum* to carry the seed capsule. Another of his reciprocal crosses used *R. thomsonii* and *R. williamsianum.* With *R. williamsianum* as the seed plant, seed produced was sparse, larger plants grew and the florets were a darker red color. The selected hybrid from the group was named *R.* 'Currant Bells'. Most of my own crosses that have bloomed so far, seem to prove the opposite view. A greater number of them have resembled the pollen parent. One might like to experiment a bit with reciprocal crosses and form his own opinions.

I think most hybridizers breed according to their own conditions, climates, and locations. Easterners must search for hardy plants and flowers; Midwesterners, Southerners and Californians need heat tolerance. Each has his own set of problems to improve or overcome. Most growers feel that the day of the tall tree-like rhododendrons is about over. Because of our smaller properties, it is necessary that we acquaint ourselves with the low-growing shrubs and the dwarfs. These midgets have a fine range of beautiful foliage and bloom in all colors. There are so many desirable qualities that it is fortunate that we do not all have the same tastes or prefer that all rhododendrons look alike.

Hybridizing can stimulate a bit of competition among us, too. Each year, we look forward to seeing the newest hybrids being shown for the first at our annual Rhododendron Show. In the early days of the hybridist,

the nurserymen were extremely secretive about their hybridizing programs. *R.* 'Pink Pearl' was almost lost to us because of this tradition. When *R.* 'Pink Pearl's' first bud was about to open in the Waterer's nursery in England, the plant was taken out to an area where they disposed of their woody refuse and "hidden". Late in the day, when the old gentleman strolled out to this area to have a look at his newest creation, he was horrified to find it gone. Nowhere could they find it. They suspected that a competitor had stolen it. Next day, while walking to the local village, he chanced to look into the yard of a small cottage and there spied his rhododendron. He marched up to the cottage and demanded to know where the plant had been obtained. Quite simply, one of their seasonal laborers had spotted the pretty flowering plant and since the nursery had apparently discarded it, the worker had taken it home to brighten his own garden. Needless to say, *R.* 'Pink Pearl' was promptly returned to it's rightful home.

It is often emphasized that we must use the best forms of any rhododendron in breeding. Sir Edmund Loder is one who proved this point when he crossed his best *R. fortunei* as a seed parent with neighbor's superior *R. griffithianum* as the pollen parent. In 1901, the famous *R.* 'Loderi King George' and the Loderi grex was begun. That same cross has been repeated many times using different clones of the same species, but it has never again succeeded in producing the quality of Mr. Loder's hybrids. It has been speculated that there may have been a genetic change of the chromosomes at work here in the splendid Loderi group.

An interesting story comes to mind about Hjelmer Larson of Tacoma. In the late 1930s, he crossed *R.* 'Marinus Koster' and *R.* 'Snow Queen'. These seedlings gave promise of being very tall growing hybrids. About 100 plants were planted out and after three years, he began to wonder why he should be propagating such large rhododendrons when gardens were shrinking. So he lopped off the heads of 97 seedlings, using the rootstocks left for grafting purposes. Three plants from this cross were retained and grown on to flowering size. One of them is *R.* 'Elizabeth Titcomb', another is *R.* 'Diane Titcomb' and the third was named *R.* 'Julie Titcomb'. All three of these rhododendrons have received PA awards from the American Rhododendron Society. What outstanding flowers and plants might have come from the remaining 97 rhododendrons if they had been allowed to grow to flowering size, too!

SOME GOOD PARENTS

'Marinus Koster'	'Mars'
'Britannia'	'Anna'
'Unknown Warrior'	*williamsianum*
'Corona'	*wardii*

SCENT	*INDUMENTUM*
Fortunei series	*yakusimanum*
Loderi hybrids	*bureavii*
occidentale	
Maddenii series	

DWARFING TENDENCY

dichroanthum
williamsianum
repens
haematodes
yakusiamanum
'Cunningham's (caucasicum) White'

Note: The story of Pink Pearl can be read in "Hardy Rhododendrons" by Frederick Street.

GWEN BELL

NEED STOCKING STUFFERS?

Visit the Foundation Office for

- Notecards
- Cutting books for that green-thumb friend
- Japanese Garden booklets for that self-conducted tour
- Other goodies for many interests

For information call 325-4510

UNIT CONVERSATIONS

It has been an interesting fall for Unit Council: two public lectures, a series of training programs for persons interested in becoming tour guides in the Arboretum, and the annual Bulb Sale.

Our "Bulb Lady" Jeanne Gardner, reporting completion of the successful Bulb Sale tells of orders going to 125 out-of towners, including a package of narcissis sent to a homesick Seattlite living in Denver. It will be interesting to hear how the bulbs survive a cold winter in the mile-high city. Another order included one dozen of each kind of *Alium* offered. This was sent to a former Seattlite (now a food consultant in Costa Rica) who intends growing the bulbs for commercial seed purposes on his 24-acre "retirement farm" in Costa Rica.

The director of the Botanic Garden, Adelaide, Australia visiting our Arboretum this summer, read the Bulb List and was amazed that it offered bulbs unavailable elsewhere. He ordered a variety of Washington natives and dry bulbs, which possibly will be personally delivered by the Gardners on their vacation trip to New Zealand and Australia shortly. How's that for service?

"Indoor Gardening Under Lights" a talk and demonstration by Pat Morrison, Portland author and lecturer, was held November 6th at Museum of History and Industry. This program, open to the public, was sponsored by Unit 84, our House Plant Unit.

The eleven Mercer Island units sponsored Marilyn Bale in another public program, November 14th at Mercer Island Presbyterian Church. In her talk Mrs. Bale emphasized how to use house plants and dried arrangements. She discussed picking weeds, making attractive bouquets, making wreaths and table arrangements for the holidays.

A lecture series, "Propagating a Pea Patch," will be sponsored by Unit Council in January and February. Louis Opfer Cooperative Extention Service, will give four two-hour lectures. He will discuss growing vegetable crops from seed and seedlings, transplanting, and soil conditions for gardening in containers as well as in the garden plot.

In February and March, Jean Witt will give four lectures on learning to understand the new condensed version of Hitchcock's book *Flora of the Pacific Northwest*. With instruction, slides and lectures, participants will learn characteristics of plant families and practice with actual plant material.

Further information about time and place for the classes is available at the Foundation office. Hitchcock's book is also available there.

A new evening House Plant Study Group is being organized by Isabel Johnson. The group will meet the first Wednesday evening each month in members' homes. If you are interested, phone Isabel at 283-1765.

Shirley Veblen

Book Reviews

THE CULTIVATION OF NEW ZEALAND TREES AND SHRUBS, by L. J. Metcalf. A. H. & A. W. Reed, Wellington, Sydney, London, 1972. (71 black and white illustrations, 74 line drawings, and 48 color illustrations.) 292 pp. $12.50.

To those who are interested in cultivating exotics from the southern hemisphere, this book will become an authoritative reference. Over 450 species of woody plants are included and the detailed information given for these reflects the first-hand experience of the author. The introductory chapters explain the basic techniques of plant propagation and provide suggestions for designing a garden. Preferences of the included species for sun or shade or for dry or moist sites, and their tolerances to frost are noted. A useful chapter on pests and diseases gives a chart which cites for each disease, the host, the vector, and the symptoms and treatment of the disease.

Since all of the species have been grown and studied by Mr. Metcalf in Christchurch, the climatic conditions for that city are documented so that the reader can compare that environment with another part of the world, and in turn, select cultivable plants for a particular ecological regime.

The second part of the book, and perhaps most valuable, describes the New Zealand plants worthy of cultivation. The genera are arranged alphabetically, and each is described taxonomically and then discussed in terms of growth requirements, means of propagation, and long-term care. As no key to the families or genera is furnished, the identification of the plants must be done by reading the descriptions and by referring to the numerous illustrations; however, abbreviated keys to the species and cultivars of the larger genera, such as *Hebe* and *Senecio*, are given. The color illustrations are mostly excellent, but the line drawings and black and white illustrations are fair to good. Not to be overlooked by bibliographers is the description of a new group of cultivars in Appendix I as well as full citations of all of the included names and their synonyms. Many of the terms in the glossary are defined with less precision and clarity than what is desired, but this is a minor criticism. The overall presentation of the material is well-organized and pleasing, and should appeal to adventurous horticulturists who enjoy diversifying their gardens with plants from other parts of the world.

MELINDA F. DENTON, DEPT. OF BOTANY, UNIVERSITY OF WASHINGTON

WATCHING WASHINGTON BUTTERFLIES, by Robert Michael Pyle, with a foreword by Roger Tory Peterson. Seattle Audubon Society, 1974. 109 pp., with 64 color photographs by the author.

This attractive little book, written by a biologist who is clearly on the side of the angels, shows so much promise that it is indeed worthy of some constructive criticism. The author does not claim that it is a complete, technical monograph; as his primary audience he sees the "weekend naturalists," essentially all those "who wish to add the study and enjoyment of butterflies to their repertoire of appreciative outdoor pursuits." With this in mind, he has in several places given us tantalizing, attention-catching details. Thus, he mentions the mimicking of the monarch butterfly by the viceroy, the fantastic migrations of painted-lady butterflies, and the "puddling-habit" of several species. Bravo! He could not be more right in his approach; but my complaint is that he has not given us enough of it, and that his information is unnecessarily scattered. It certainly would be nice if in the next edition more attention could be given to plant-herbivore relationships (food-preferences of the caterpillars!), to the senses of smell and taste (some butterflies taste with their feet!), to the mating-habits of butterflies (the males of meadowbrowns and fritillaries influence the females with a perfume produced by special scent-scales!), to the general characteristics of butterfly-favored flowers (why are composites so good?), etc. Some more etymology with the entomology would also be nice. Why not mention, e.g., that the word fritillary is derived from a Latin word for dice-box (usually studded with pieces of mother-of-pearl), and that the species-name "atalanta" of the red admiral refers to the dazlling white spots on the sides of the caterpillar, thought to represent the silver coins which the unfortunate Atalanta won when she was imprudent enough to beat a Greek goddess in a race? (The poor girl was changed into the red admiral butterfly for punishment.) Instead, we find some insipid information on the "friendliness" (!) of the red admiral in the garden, who is said to approach and perch on people (attracted by their sweat, this reviewer is sorry to say; with such friends, who needs enemies?) There is some misinformation in the book too, e.g., I challenge the notion (p. 67) that "the pupae of the mourning-cloak, gray and thorny, may be found gregariously with a large number concentrated in a small area under bark and leaves." The truth is that the *caterpillars*, which are non-too-palatable, black and spiny, with conspicuous brick-red patches on their backs, advertise their unpleasantness to the hilt by forming clusters in the foliage of their food-trees. (A marvelous illustration of the theory of warning colors—another thing that should have been mentioned in the book, since it is quite important in butterflies.) When the time for metamorphosis arrives, they let themselves fall from the trees, and start racing away *in all directions*; after a half hour or an hour they will then climb up on the first tree or pole that is handy, and pupate. The scattering of the palatable pupae or chrysalids, which—as Pyle mentions—are "gray and thorny" (i.e., rely on camouflage!!) definitely has survival value for the species, since the finding of one pupa by a bird or squirrel (by chance) now will *not* automatically lead to the wiping-out of the whole brood. Clustering of the pupae would simply invite disaster!—Red admiral caterpillars are *not* all black (see above), and in my experience do *not* build colonial leaf-tents; on nettle, at least, I have always found them to be rugged individualists. The notion of pugnacious, aggressive butterflies, which keeps cropping up in the book, should also have been laid to rest long ago. (In reality, we are dealing with sex without violence.)

The color-reproduction of the photographs could have been much better (we suspect that the originals are quite all right). The number of spelling-errors in the book, especially in Latin names *("Ceonothus," "Castalleja," "Arceuthabium," "Symphocarpus")* also is unacceptable. And finally, we deeply deplore the use of "Xerces," rather than Xerxes, in the name of the "Xerces-society." The Xerxes blue, which fell prey to America's most successful animal, the developer, in the sand-dunes near San Francisco, is referred to as *Lycaena xerxes* (Boisduval) in Holland's well-known butterfly book. Ehrlich, as well as Comstock, use "Xerces," but our feeling is that this is a case of *lese majesty*, which will make the old Persian monarch, Xerxes I, turn over in his grave. Let's not take chances! Was not he the imperious gentleman who, in his campaign against the Greeks in 480 B.C., had the waters of the Hellespont flogged when they did not quiet down fast

enough to suit his purposes? Dinosaurs like the present reviewer also consider that the name Xerxes has been a hallowed one ever since it was given to the opera for which Handel wrote his noble and moving love-song, the Largo ("Ombra mai fu"), which we now hear mostly at funerals. Hands off, my dear butterfly friends! We wish you well, and hope that your stimulating and *very* useful book will go through many, many reprints—but we shall steadfastly refuse to join a group which calls itself the Xerces-society!

B. J. D. MEEUSE
DEPARTMENT OF BOTANY
UNIVERSITY OF WASHINGTON

WASHINGTON WILDFLOWERS, by E. J. Larrison, G. W. Patrick, W. H. Baker, and J. A. Yaich, Seattle Audubon Society, Seattle, printed by Durham & Downey, Inc., Portland, 1974. 376 pp. $6.45.

At different elevations, the Pacific Northwest offers a wildflower display from April to October. Growing interest in the native plants has created a need for books which provide basic information about plant identification as well as the use of plants as food, herbs, or medicines. The comprehensive and superbly illustrated *Flora of the Pacific Northwest*, by Hitchcock and Cronquist, goes beyond the needs of those who want to identify just the common and showy wildflowers of the state. For this, a lightweight, inexpensive paperback, supplied with ample illustrative material, is required. *Washington Wildflowers* is a book which was apparently designed to fill that niche, but it is unfortunate that the product does not meet expectations.

The wildflowers included in the book are limited to those with a herbaceous habit. This is restrictive as some of our showiest springtime flowers are salmonberry *(Rubus spectabilis)*, thimbleberry *(Rubus parviflorus)*, and flowering currant *(Ribes sanguineum)*, and all are omitted from consideration because of a shrubby habit. The conspicuous devil's club, *Oplopanax horridum*, also escapes mention. "Wildflower" is a vague term, but one wonders why *Chenopodium album*, the most frequently encountered goosefoot, is not included among the other species of *Chenopodium*. The failure to note *Cirsium arvense* and *Cirsium vulgare* is questionable since these are the most abundant species of thistles in the state; both of these may be weedy, but so is the dandelion, *Taraxacum officinale*, which manages to get its name in print. Aside from the noted omissions, 90% of the herbaceous wildflowers (1134 species) are included.

Misidentifications of the photographs are many, with some of these reflecting errors at the familial as well as at the generic level. A few examples are: "*Lesquerella*" [Cruciferae] for *Astragalus* [Leguminosae] (p. 106), "*Cardamine*" for ? (p. 122), "*Saxifraga*" for *Heuchera* (p. 130), "*Oxyria*" [Polygonaceae] for *Valeriana* [Valerianaceae] (p. 136), "*Vicia*" for *Astragalus* (p. 151), "*Sphaeralcea*" for *Iliamna* (p. 174; and picture appears upside down), "*Valeriana*" [Valerianaceae] for *Actaea* [Ranunculaceae] (p. 278), "*Draba*" [Cruciferae] for *Stellaria* [Caryophyllaceae] (plate 19), "*Lepidium*" for ? (plate 20), "*Satureja*" for *Lamium* (plate 47), "*Lobelia*" for *Campanula* (plate 54), and "*Gnaphalium*" for ? (plate 62). On plates 40 and 41, *Linanthus* and *Linanthastrum* are treated separately but the same species *(Linanthus nuttalli = Linanthastrum nuttalli)* is used to illustrate both genera.

Other marks of carelessness are found throughout the book. Errors abound in the drawings which demonstrate the features of leaves and inflorescences. On page 25, the heading "leaf arrangement" also includes terms which apply to leaf bases and to kinds of leaves; under "inflorescence types," the "raceme" is actually a modified cyme, the "corymb" is possibly a panicle, and the "cyme" is a corymb. On page 26, the phrase "linear venation" is not used botanically, the heading "leaf margins" encompasses leaf shapes as well, "renate" is misapplied for reniform, the "toothed" margin is actually crenate, and the "crenate" margin is sinuate. The glossary is disappointing with many terms inaccurately defined or misleading—the definition given for "bulblet" is really that of bulbil; a corm is a type of specialized underground stem, not the "solid, fleshy base of a stem." Misspellings are found: "calyxes" for calyces (p. 76), "Lepdidium" for *Lepidium* (p. 116), "Luetkia" for *Luetkea* (plate 25), "Bessya" for *Besseya* (plate 48), and "velarian" for valerian (plate 52). On page 113, the name "Draba curvifolia" is incorrectly cited for *Draba cuneifolia*, and on page 221, the description of the Gentianaceae is confusing: "opposite, nonpetioled, simple, entire leaves on a 4- or 5-toothed calyx and a 4- or 5-lobed corolla."

The major attraction of the book is the set of colored photographs as most are very good. The black and white illustrations are of little benefit—those of the habitats are faded and those of the authors using their cameras seem wasteful of space. The keys to the families and genera work fairly well although their brevity and lack of technicality often lead to confusion. The authors acknowledge the use of the five-volume *Vascular Plants of the Pacific Northwest* and the one-volume *Flora of the Pacific Northwest* for nomenclatural purposes, but perhaps these volumes should have been noted as major references. A comparison of the keys in *Washington Wildflowers* with those of the above shows a remarkable similarity in their construction, both in the selection of the taxonomic characters and their position as leads; as a case in point, one wonders how the similarity could be coincidental when comparing the keys of the Cruciferae.

Until the errors and shortcomings in this book are corrected, I hesitate to recommend its general use as a guide to learning the Washington wildflowers. The non-professional, for whom the book is intended, will not be able to detect what is right from what is wrong.

MELINDA F. DENTON,
DEPARTMENT OF BOTANY,
UNIVERSITY OF WASHINGTON

CHOICE and UNUSUAL
Trees — Shrubs — Vines
Garden Accessories.
TROPICAL INDOOR PLANTS
Largest & Finest Selection
In the Entire Northwest

Cut Flowers
Potted Plants and Gifts
COMPLETE FLORAL SERVICE

Swanson's
LAND OF FLOWERS
9701 - 15th N.W. — Phone SU 2-2544
Producers of Fine Plants Since 1888

Choice Selection
Winter Flowering
SASANQUA CAMELLIAS
15 Varieties

8370-166th Ave. N.E.
Redmond 885-1477

26 Years of Personal Service

R.
David
Adams
Landscape Design Contracting
Florist Studio Garden Shop Container Showroom
222 First Avenue South Seattle, Washington 98104
622-5325 622-4732

INSURED LICENSED
Robertson
TREE & SPRAY SERVICE
SPRAYING
PRUNING
TOPPING
REMOVALS
SURGERY
FEEDING
VIEW TRIMMING
DIAGNOSIS &
INSPECTION
SH 7-1200
14548 S.E. 26th BELLEVUE

GIVE A GARDEN FOR CHRISTMAS

Give a gift that will be around long after Christmas is over . . . Enroll your friends and relatives inthe Arboretum Foundation.

A membership packet will be sent to announce your gift.

Your Name _____

Please Enroll As A Member Of The Arboretum Foundation:

Name _____

Address _____

City, State _____

Annual $5.00 ☐

Sustaining $10.00 ☐

Contributing $25.00 ☐

ENGLISH IMPORTED AURICULAS
POLYANTHUS • SPECIES
PACIFIC HYBRID DELPHINIUMS
EXBURY AZALEAS • PERENIALS
DWF. GERANIUMS
BONSAI MATERIALS

Primrose Acres

Between Kenmore and Juanita on 84th Ave. N.E.
(Turn E. off Juanita Dr. on N.E. 141st,
drive 1 mile to 84th)

VA 2-6176
MRS. L. G. TAIT

14015 - 84th Ave. N.E.
BOTHELL, WASHINGTON

Jardinier Consulting Service

DIAGNOSING PLANT PROBLEMS
INSECT - DISEASE - ENVIRONMENTAL
INDOOR & OUTDOOR

WALTER F. BUBELIS 365-6978

For GIFTS and FLOWERS
of Unmistakable Distinction

Crissey
FLOWERS • GIFTS
622-1100

1335 Fourth Avenue — Washington Building 2100 Fifth Avenue at Lenora

Be a Super Special Santa

Give a SPECIAL BOOK to that SPECIAL PERSON
Give THE LONG ROAD TRAVELLED

Contains:
- the only published story of our Arboretum
- anecdotal charm
- over 100 photographs

Published by the Arboretum Foundation

ARBORETUM FOUNDATION
UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

Please accept my order for ..... copies of

THE LONG ROAD TRAVELLED

At $9.00 per copy.
A special limited edition is available.

NAME .....

STREET .....

CITY ..... STATE ..... ZIP .....

SUPPORT YOUR ARBORETUM

Compliments of

FRAYN PRINTING COMPANY

LETTERPRESS • LITHOGRAPHY • STEEL DIE ENGRAVING

2518 WESTERN AVENUE • SEATTLE, WASHINGTON 98121/(206) 623-4221

THE ARBORETUM BULLETIN

Published by the
Arboretum Foundation
University of Washington Arboretum
Seattle, Washington 98195

ADDRESS CORRECTION REQUESTED

NON-PROFIT ORG.
U.S. POSTAGE PAID
SEATTLE, WASHINGTON
Permit No. 126

COMING EVENTS CALENDAR

DATE	EVENT
December 12	Quarterly Board Meeting
December 25	MERRY CHRISTMAS
January 6	Rhododendron Study Group
January 8	Bulletin Editorial Board
	House Plant Day Study Group
January 9	Foundation Executive Committee
January 14	House Plant Study Group (Night)
January 15	Rock Garden Study Group
January 17	Pea Patch Propagation — Louis Opfer Lecture No. 1
January 20	Northwest Native Plant Study Group
January 22	Arboretum Explorers
January 24	Pea Patch Propagation Lecture No. 2
January 31	Pea Patch Propagation Lecture No. 3
February 7	Pea Patch Lecture No. 4 (Final)

LOOKING AHEAD

February 20	Understanding Dr. Hitchcock's Book — Jean Witt Lecture No. 1
February 27	Understanding Dr. Hitchcock's Book Lecture No. 2
March 24	Understanding Dr. Hitchcock's Book Lecture No. 3
March 31	Understanding Dr. Hitchcock's Book Lecture No. 4 (Final)

REMEMBER

Every Tuesday	Greenhouse Day
Every Friday	Herbarium Committee

FOR INFORMATION, CALL 325-4150